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ABSTRACT

A feedback system for reporting individual pupil variables; classroom, school, and districtwide summaries was designed. The system utilized optically scanned forms which produced input files for report production. The system was designed so that the numbers and types of variables were fixed, but that the content of the variables was completely flexible to meet widely varying needs from district to district. Content labels facilitated interpretation of variables for different grade levels and districts. The system was able to provide a five-working-day turnaround from the day the forms were received by the central office. (Author)

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Systems Design and Programming  
for a Flexible, Multi-purpose  
Feedback System

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### ABSTRACT

A "feedback" system for reporting individual pupil variables, classroom, school and district wide summaries was designed. The system utilized optically scanned forms which produced input files for report production. The system was designed so that the numbers and types of variables were fixed but that the content of the variables was completely flexible to meet widely varying needs from district to district. Content tables facilitated interpretation of variables for different grade levels and districts. The system was able to provide five working day turnaround from the day the forms were received by the central office.

## Introduction

Our feedback system needed to keep the customer satisfied in three dimensions-not necessarily orthogonal. The first dimension was level of management. The second was the variety of variables to be reported, and the third was Individual District requirements, the School District of Philadelphia being divided into eight sub-districts each having its own requirements. Although the system needed to accommodate any content it was developed in cooperation with the district reading teams.

## Market Survey

Our first step was to contact the various levels of managers and survey them as to their data needs for decision making. A conference was held with each District reading team and the systems design staff. The District reading team was able to express the managerial needs for the District Superintendent, supervisors of reading, reading teachers and classroom teachers. Of course, each District felt their particular decisions and the variables needed for them were the most important and must be included in the reports. So, a compromise had to be worked out to provide a mix of reported variables that would include most of the needs expressed. A major consideration in the compromise was the fact that the responsibility for collection of the data lay with the classroom teacher, therefore the reports would need to reflect and regard her efforts in order to make the system viable.

Central office curriculum staff were also interviewed and their needs were input into the compromise.

## What did we squeeze out of the Compromise?

Several other constraints were also considered. For, instance, with how many pages of output could a customer cope in reviewing the report he received. It was decided that two pages could contain enough information for a decision maker at the classroom level to have meaningful feedback for each student and to summarize the classroom information too. Thus, each classroom teacher report consisted of two pages for each reading program, one page was a one-line per pupil report and the second a classroom summary.

Principals would receive duplicates of the classroom reports plus summary pages for each program within a grade for his school.

Another constraint was time. We felt that turnaround over one week would begin to age the report information to where it might be useless for decision making especially at the classroom level. So, the data reduction, file manipulation, and report generation had to be efficient enough to work into the existing computer operations schedule.

These compromises and constraints led to the final parameters of the report system.

**Variables Manipulated:**

**Summary Statistics**

Eleven nominal variables	Frequencies, Percentages
Two ordinal variables	Frequencies, Percentages, Medians
Eight interval variables	N, Mean, SD

The nominal variables (Yes-No) were used to report services received by the pupil or to indicate certain program conditions. The two ordinal variables reported the Individual Reading Inventory level and the reading program book level. The eight interval variables covered test scores and absenteeism expressed as an interval variable. Each variable was reported for two points in time so that gains and differences could be examined, however, the content of the variables could pertain to any desired.

To accomodate the fact that each of the eight districts and the more than 36 reading programs over 13 grade levels (K to 12) would require that the reported variables be different, a system of header and line labels was worked out so that each district could specify its own report headers and variable labels for each grade level. Further, the computer program was dimensioned to accomodate up to six different reading programs in any one grade.

Each district also custom designed its own data collection form. These were OpScan forms on the first year and are now NCS forms. In either case the various district forms when scanned produced a data record having a common format. In this way the computer program always saw the same input variables regardless of a specific district's content.

**Did we keep the customers satisfied?**

Well, we hope so, we supplied flexibility across diverse district needs by allowing data collection forms, and report labels and headings to be customized grade by grade and district by district. Thus, even though all the customers were restricted to using the same set of types of variables they were able to plug in their own particular information. We supplied the needs of various management levels by generating reports and summaries meaningful to their particular decision making processes, and we developed a system which could be executed with the existing computer hardware, software and work schedule.

**Examples**

Figures 1,2, and 3 show Classroom Pupil Report, Classroom Summary Report, and School-Grade Summary Report for the "MULTI-LEVEL WITH OPER. RSC" reading program. Figure 1 contains a line for each pupil showing his or her entries for various variables. A glossary of labels is on the bottom of the form. Figure 2 shows a summary for the same classroom. Figure 1 and 2 constituted the classroom teacher's report.

Figure 3 shows the principal's report for the same reading program summarized over all rooms in his or her school.

District Summary. Figure 4 shows District Summary for a reading program in grade eight. The top three lines identify the Reading Program (Multi-level), All schools in the district, the eighth grade, All rooms with a pupil total of 4449. The report covers three time points (CKPT-1, CKPT-2, CKPT-3.) One of the two ordinal variables is reported at the top section of the page. The number, percent, and median are reported for Reading Program Book Level for one pupil. The asterisks indicated the median. The levels range from "PPL ORA" in the first column to "27" in the second column. Three data summaries are presented in the center section of the page. The left most displays numbers and percents of the total pupils on each of the eleven nominal indicators. Next to the right is the Absence summary showing the numbers, total percent, and medians for two check points. On the right center is the second ordinal variable display showing number, percents, and medians for only pupils having this information. Note that the median moved from "BOOK5" in CKPT-1 to "BOOK6" in CKPT-3, 2432 pupils were reported at CKPT-1 while only 1968 were reported at CKPT-3.

At the bottom of the page are displayed means, standard deviations, and total pupils reported for six interval variables at two CKPT'S and the differences. Note that while 1815 and 1840 pupils were reported for the "ALPHABETMASTER UC" PRE and POST, means respectively, only 1144 were reported in the difference mean. This difference, calculated by the computer program is not the same as 55 minus 44 as it was calculated from only the pupils having both PRE and POST scores. The other four variables were unlabeled. All values were rounded to the nearest integer and not reported if less than one.

The remaining display in the lower right corner contains something labeled IOWA Reading means, standard deviations for 1970 and 1971, but appears to be two variables expressed on different scales. There is also a district identification masthead in the lower right corner.

Data Collection Form. District Seven designed a two sided NCS form. The green side was for use in grades one through six while the red side was for use in grades seven through twelve. A separate NCS scanning program was written for each side of the form. Header targets were used so that it was not necessary to enter group information on each pupil's form. The form was continuous, that is, the form could be pre-printed with individual pupil identification in the masthead areas. This printing included "slugging" targets for the pupil ID number, school, and grade codes.

System Flow. Figures 6 through 10 show the system flow charts for processing data through the system. Pre-printing (Figure 6) and distributing forms required one to two weeks. Data collection (marking forms) was done by teachers and/or aides. Headers were added and district staff edited the forms before processing on the NCS scanner. Scanning forms, sorting of files, and production of reports could be completed in five working days, so that reports could be returned in one week after the forms were received by the central office.

READING PROGRAM MULTI-LEVEL WITH OPER. #SC SCHOOL DISTRICT OF PHILADELPHIA  
READING PROGRESS REPORT  
INDIVIDUAL REPORT  
DISTRICT TWO

REVISED REPORT - FEB. 14, 1972

SCHOOL #2  
GRADE 02  
ROOM #A

PAGE 1

CAT  
NUM  
READING

ABS TEST  
1 2 CNT

PUPIL NAME	MOB	SULLIVAN END			BOOK PLACEMENT OF			BOTEL LEVEL			BOTEL LEVEL			CAT NUM READING			
		1	2	1	2	3	BOOK	BK	BK	BC	TEST	A	B	T	1	2	CNT
***	06 06	0	0	0	0	0						17	63	0	0	0	0
***	06 06	0	0	0	0	0						17	63	0	0	0	0
07 07	0	0	0	0	0	0	45	16	62	0	0	0	0	0	0	0	0
06 07	0	0	0	0	0	0	02	44	48	0	0	0	0	0	4	0	555
06 07	0	0	0	0	0	0	33	05	51	0	0	0	0	0	18	0	555
05 06	0	0	0	0	0	0	41	00	36	0	0	0	0	0	14	0	444
06 07	0	0	0	0	0	0	42	14	60	0	0	0	0	0	18	0	555
06 07	0	0	0	0	0	0	45	19	50	0	0	0	0	0	3	0	555
06 07	0	0	0	0	0	0	04	04	04	0	0	0	0	0	9	0	444
06 07	0	0	0	0	0	0	42	16	62	0	0	0	0	0	20	0	455
05 06	0	0	0	0	0	0	44	12	58	0	0	0	0	0	14	0	455
05 06	0	0	0	0	0	0	40	12	56	0	0	0	0	0	16	0	445
05 06	0	0	0	0	0	0	43	08	54	0	0	0	0	0	11	0	545
06 07	0	0	0	0	0	0	37	17	62	0	0	0	0	0	3	0	444
06 07	0	0	0	0	0	0	37	17	62	0	0	0	0	0	25	0	555
06 07	0	0	0	0	0	0	10	46	51	0	0	0	0	0	15	0	555
06 07	0	0	0	0	0	0	56	13	56	0	0	0	0	0	0	0	511
06 07	0	0	0	0	0	0	45	12	58	0	0	0	0	0	13	0	455
05 06	0	0	0	0	0	0	40	04	50	0	0	0	0	0	10	0	555
05 06	0	0	0	0	0	0	40	07	49	0	0	0	0	0	9	0	455
06 07	0	0	0	0	0	0	45	10	55	0	0	0	0	0	10	0	555
**	08 08	0	0	0	0	0	12	17	63	0	0	0	0	0	0	0	0
06 07	0	0	0	0	0	0	45	01	51	0	0	0	0	0	16	0	555
C4 05	0	0	0	0	0	0	40	06	30	0	0	0	0	0	9	0	444
05 06	0	0	0	0	0	0	28	06	45	0	0	0	0	0	17	0	444
05 06	0	0	0	0	0	0	46	13	52	0	0	0	0	0	13	0	555
06 07	0	0	0	0	0	0	46	16	62	0	0	0	0	0	16	0	555
06 07	0	0	0	0	0	0	41	15	59	0	0	0	0	0	18	0	555
06 07	0	0	0	0	0	0	45	07	53	0	0	0	0	0	8	0	555

BEST COPY AVAILABLE

N = IS MOBILITY  
\* = IS NEW TO CLASS  
\*\* = IS NEW TO SCHOOL  
C = IS NEW TO DISTRICT  
S = IS NEW TO OTHER

CAL. READING TEST  
\*V IS VOCABULARY  
\*C IS COMPREHENSION  
\*E IS FOLLOW THRU  
\*I IS TOTAL  
SP IS PRIVATE NURSERY

PRE-SCHOOL  
H = HEAD START \*K IS KINDERGARTEN  
G = GET SET C = CHILD CARE CTR.  
F = FOLLOW THRU \*O IS OTHER

\*V IS HEAD START \*K IS KINDERGARTEN  
\*G IS GET SET C = CHILD CARE CTR.  
\*E IS FOLLOW THRU \*O IS OTHER



Figure 3

**SCHOOL DISTRICT OF PHILADELPHIA**  
READING PROGRESS REPORT  
SUMMARY REPORT

	<b>CKPT-1</b>	<b>CKPT-2</b>	<b>CKPT-3</b>
	<b>BK NO PCT MDN NO PCT MDN NO PCT MDN</b>	<b>BK NO PCT MDN NO PCT MDN NO PCT MDN</b>	<b>BK NO PCT MDN NO PCT MDN NO PCT MDN</b>
	10	11	12
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	282	283	

## READING PROGRAM - MULTI LEVEL

SCHOOL OF INSTITUTE OF PHILADELPHIA  
READING PROGRAMS REPORT  
SUMMARY REPORT!ALL GRADE  
NO PCT MON NO PCT MON ALL PAGE 2

CKPT-1 CKPT-2 CKPT-3 EX NO PCT MON NO PCT MON CKPT-1 CKPT-2 CKPT-3

BK NO PCT MON NO PCT MON NO PCT MON

1000000

11

12

13

14

15

16

17

18

19

20

READING 21

PROGRAM 22

23

BOOK 24

25

LEVEL 26

27

TOTAL PUPILS 1

9

8

7

6

5

4

3

2

1

0

1

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5

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7

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9

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GROUP READING INVENTORY LEVEL  
CK PT-1 CK PT-3

BOOK NO PCT MON NO PCT MON

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BEST COPY AVAILABLE

BOOK NO PCT MON NO PCT MON

PPL OR A

PPZ OR B

C

D

READING

1

PROGRAM

2

BOOK

3

LEVEL

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<b>HOW TO FILL IN THIS FORM CORRECTLY</b>		GRADES 1-6	
1. Use lead pencils only. 2. Carefully erase all unwanted marks. 3. Fill in response positions neatly.		<input checked="" type="radio"/> Correct <input type="radio"/> Unacceptable <input checked="" type="radio"/> Unacceptable <input type="radio"/> Unacceptable	
<b>Dr. Thomas K. Minter</b> Superintendent  <b>Mrs. Reeda Kravinsky</b> Reading Project Manager			
<h1 style="text-align: center;">THE DISTRICT SEVEN</h1> <h2 style="text-align: center;">PUPIL R.E.A.D FORM</h2> <p style="text-align: center;">Designed by District 7 Reading Team</p>			
<b>INSTRUCTIONAL PROGRAM MAJOR COMPONENT</b>		<b>INSTRUCTIONAL BOOK LEVELS</b> GRAD 1 Chpt 2 Chpt 3 <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 9 <input type="radio"/> 10 <input type="radio"/> 11 <input type="radio"/> 12 <input type="radio"/> 13 <input type="radio"/> 14 <input type="radio"/> 15 <input type="radio"/> 16 <input type="radio"/> 17 <input type="radio"/> 18 <input type="radio"/> 19 <input type="radio"/> 20 <input type="radio"/> 21 <input type="radio"/> 22 <input type="radio"/> 23 <input type="radio"/> 24 <input type="radio"/> 25 <input type="radio"/> 26 <input type="radio"/> 27 <input type="radio"/> 28 <input type="radio"/> 29 <input type="radio"/> 30 <input type="radio"/> 31 <input type="radio"/> 32 <input type="radio"/> 33 <input type="radio"/> 34 <input type="radio"/> 35 <input type="radio"/> 36 <input type="radio"/> 37 <input type="radio"/> 38 <input type="radio"/> 39 <input type="radio"/> 40 <input type="radio"/> 41 <input type="radio"/> 42 <input type="radio"/> 43 <input type="radio"/> 44 <input type="radio"/> 45 <input type="radio"/> 46 <input type="radio"/> 47 <input type="radio"/> 48 <input type="radio"/> 49 <input type="radio"/> 50 <input type="radio"/> 51 <input type="radio"/> 52 <input type="radio"/> 53 <input type="radio"/> 54 <input type="radio"/> 55 <input type="radio"/> 56 <input type="radio"/> 57 <input type="radio"/> 58 <input type="radio"/> 59 <input type="radio"/> 60 <input type="radio"/> 61 <input type="radio"/> 62 <input type="radio"/> 63 <input type="radio"/> 64 <input type="radio"/> 65 <input type="radio"/> 66 <input type="radio"/> 67 <input type="radio"/> 68 <input type="radio"/> 69 <input type="radio"/> 70 <input type="radio"/> 71 <input type="radio"/> 72 <input type="radio"/> 73 <input type="radio"/> 74 <input type="radio"/> 75 <input type="radio"/> 76 <input type="radio"/> 77 <input type="radio"/> 78 <input type="radio"/> 79 <input type="radio"/> 80 <input type="radio"/> 81 <input type="radio"/> 82 <input type="radio"/> 83 <input type="radio"/> 84 <input type="radio"/> 85 <input type="radio"/> 86 <input type="radio"/> 87 <input type="radio"/> 88 <input type="radio"/> 89 <input type="radio"/> 90 <input type="radio"/> 91 <input type="radio"/> 92 <input type="radio"/> 93 <input type="radio"/> 94 <input type="radio"/> 95 <input type="radio"/> 96 <input type="radio"/> 97 <input type="radio"/> 98 <input type="radio"/> 99 <input type="radio"/> 100	
<b>PROGRAMMED MATERIAL</b>		<b>BASAL</b> <input type="radio"/> McGraw-Hill-Sullivan <input type="radio"/> Marshall (Linguistic) <input type="radio"/> Scott-Foresman <input type="radio"/> Houghton-Mifflin <input type="radio"/> Ginn 100 <input type="radio"/> Ginn 360 <input type="radio"/> American Book Co. <input type="radio"/> Lippincott <input type="radio"/> Other  <b>LANGUAGE EXPERIENCE</b> <input type="radio"/> Language Experience <input type="radio"/> Other	
<b>ORGANIZATION FOR READING INSTRUCTION (FILL IN ONE)</b>		<b>SUPPORTIVE SERVICES</b> Indicate Assistance Pupil Receives Regularly  <b>CHECKPOINT</b> 1      2      3 Reading Specialist ..... Reading Aide ..... Volunteer .....  Number of times each week <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 9 <input type="radio"/> 10 <input type="radio"/> 11 <input type="radio"/> 12 <input type="radio"/> 13 <input type="radio"/> 14 <input type="radio"/> 15 <input type="radio"/> 16 <input type="radio"/> 17 <input type="radio"/> 18 <input type="radio"/> 19 <input type="radio"/> 20 <input type="radio"/> 21 <input type="radio"/> 22 <input type="radio"/> 23 <input type="radio"/> 24 <input type="radio"/> 25 <input type="radio"/> 26 <input type="radio"/> 27 <input type="radio"/> 28 <input type="radio"/> 29 <input type="radio"/> 30 <input type="radio"/> 31 <input type="radio"/> 32 <input type="radio"/> 33 <input type="radio"/> 34 <input type="radio"/> 35 <input type="radio"/> 36 <input type="radio"/> 37 <input type="radio"/> 38 <input type="radio"/> 39 <input type="radio"/> 40 <input type="radio"/> 41 <input type="radio"/> 42 <input type="radio"/> 43 <input type="radio"/> 44 <input type="radio"/> 45 <input type="radio"/> 46 <input type="radio"/> 47 <input type="radio"/> 48 <input type="radio"/> 49 <input type="radio"/> 50 <input type="radio"/> 51 <input type="radio"/> 52 <input type="radio"/> 53 <input type="radio"/> 54 <input type="radio"/> 55 <input type="radio"/> 56 <input type="radio"/> 57 <input type="radio"/> 58 <input type="radio"/> 59 <input type="radio"/> 60 <input type="radio"/> 61 <input type="radio"/> 62 <input type="radio"/> 63 <input type="radio"/> 64 <input type="radio"/> 65 <input type="radio"/> 66 <input type="radio"/> 67 <input type="radio"/> 68 <input type="radio"/> 69 <input type="radio"/> 70 <input type="radio"/> 71 <input type="radio"/> 72 <input type="radio"/> 73 <input type="radio"/> 74 <input type="radio"/> 75 <input type="radio"/> 76 <input type="radio"/> 77 <input type="radio"/> 78 <input type="radio"/> 79 <input type="radio"/> 80 <input type="radio"/> 81 <input type="radio"/> 82 <input type="radio"/> 83 <input type="radio"/> 84 <input type="radio"/> 85 <input type="radio"/> 86 <input type="radio"/> 87 <input type="radio"/> 88 <input type="radio"/> 89 <input type="radio"/> 90 <input type="radio"/> 91 <input type="radio"/> 92 <input type="radio"/> 93 <input type="radio"/> 94 <input type="radio"/> 95 <input type="radio"/> 96 <input type="radio"/> 97 <input type="radio"/> 98 <input type="radio"/> 99 <input type="radio"/> 100	
<b>PHONICS INVENTORY</b> Mastery = one error or less — — — Fill in mastery at each checkpoint — — — <b>CONSONANTS</b> <input type="radio"/> Initial <input type="radio"/> Final <input type="radio"/> Blends <input type="radio"/> Digraphs		<b>VOWELS</b> <input type="radio"/> Identification <input type="radio"/> Long <input type="radio"/> Short <input type="radio"/> Combinations	
<b>GROUP READING INVENTORY</b> Indicate Reading Instructional Level  <b>CHECKPOINT</b> 1      2      3 Readiness ..... Pre Primary ..... Primary ..... Book 1 ..... Book 2 ..... Book 2 1 ..... Book 2 2 ..... Book 3 1 ..... Book 3 2 ..... Book 4 ..... Book 5 ..... Book 6 ..... Book 7 ..... Book 8 .....  <b>RHYMING WORDS</b> <input type="radio"/>		<b>TEACHER HEADERS</b> SCHOOL HEADERS <b>PUPIL COMPETENCIES</b> Indicate highest level of Mastery at Checkpoint Three  <b>WORD RECOGNITION LEVELS</b> <input type="radio"/> — — — <input type="radio"/> Comprehension Levels <input type="radio"/> — — — <input type="radio"/> Study Skill Levels <input type="radio"/> — — — <input type="radio"/> Literature Levels	
<b>END OF YEAR ATTENDANCE</b> Indicate number of days absent		0-5 <input type="radio"/> 15 <input type="radio"/> 20 <input type="radio"/> 30 <input type="radio"/> 35 <input type="radio"/> 40+ 5-10 <input type="radio"/> 20 <input type="radio"/> 25 <input type="radio"/> 35 <input type="radio"/> 40+ 10-15 <input type="radio"/> 25 <input type="radio"/> 30 <input type="radio"/> 40 <input type="radio"/> 45+  <b>ALPHABET MASTERY</b> Mastery = 100% <input type="radio"/> Upper Case <input type="radio"/> Lower Case	



Figure 6

Office of Research and Evaluation  
Multi-Task System  
Phase I Form Preparation

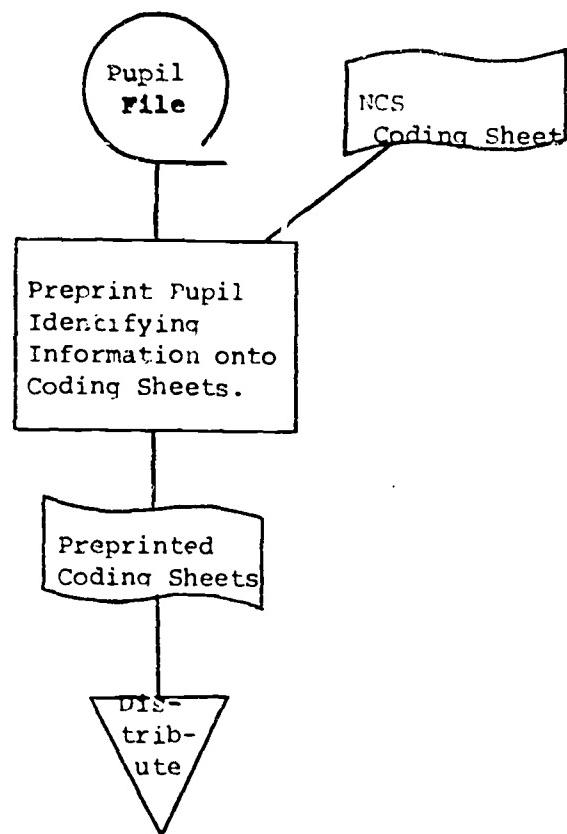


Figure 7

Office of Research and Evaluation  
Multi Process System  
Input Processing

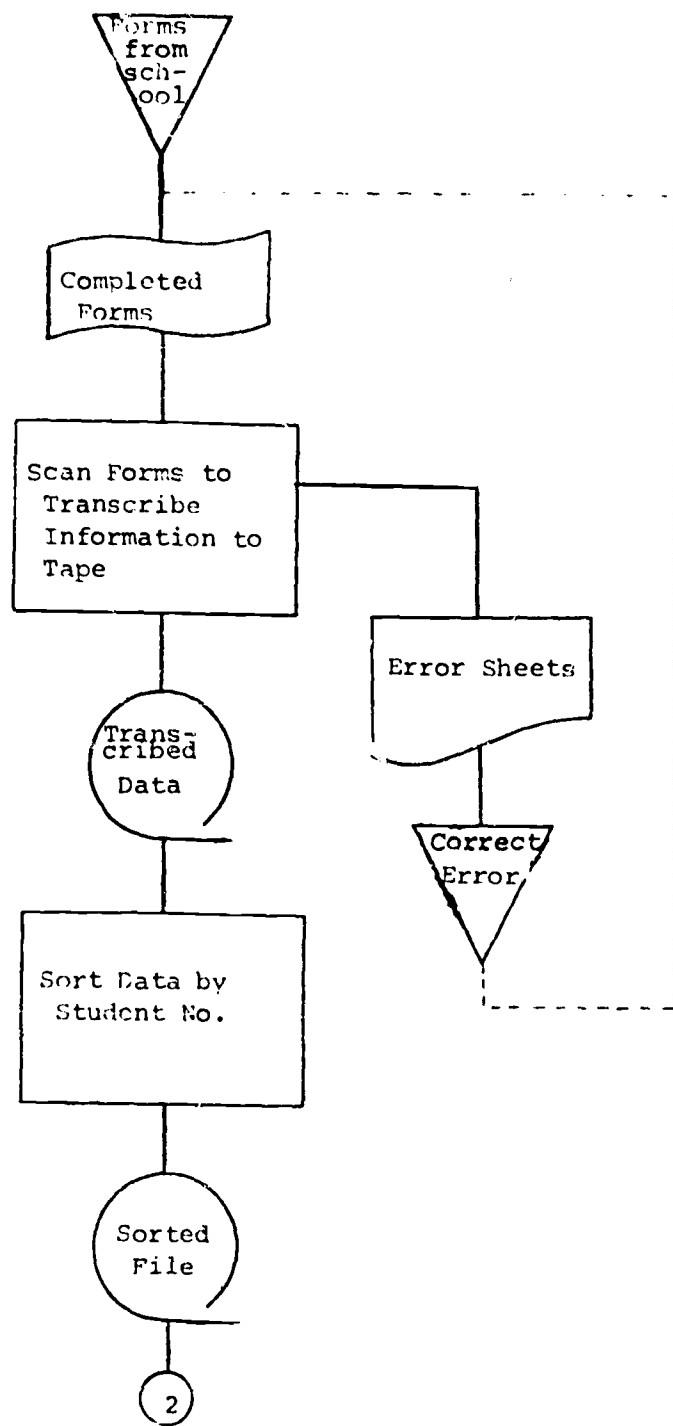


Figure 8

Input Processing-Continued

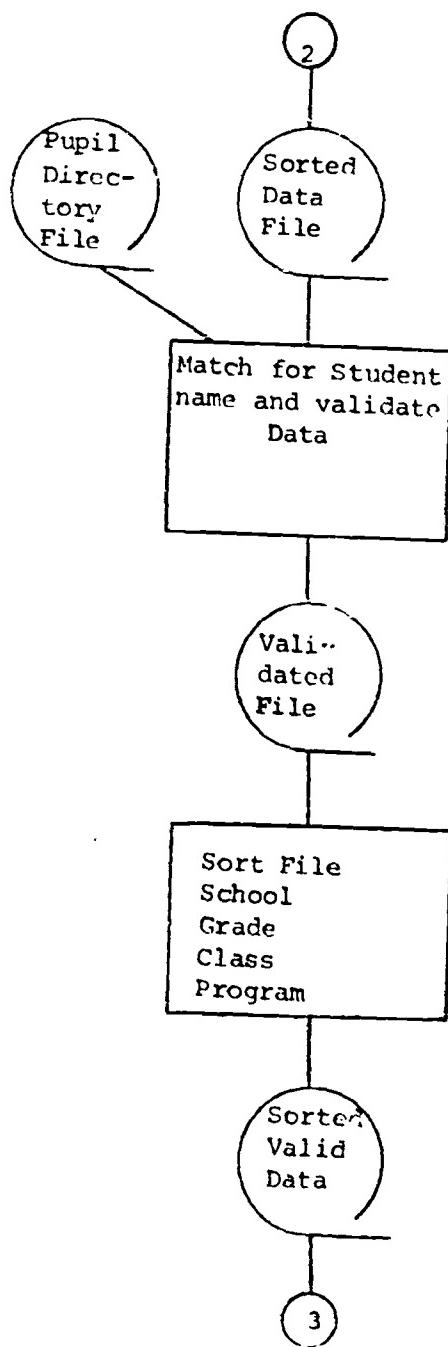


Figure 9

Input Processing - Continued

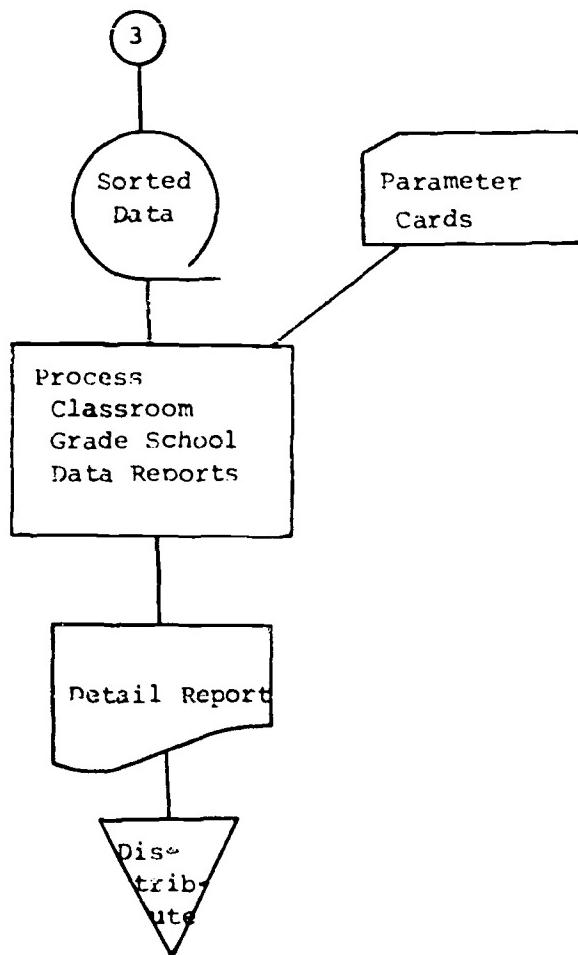


Figure 10

Input Processing-Continued

